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ABSTRACT

Given the documented link between smoking and later debilitating health conditions, a need exists to investigate educational programs aimed at reducing rates of smoking among school-age children. An entire class of ninth graders was involved in a treatment condition featuring either role-playing and discussion or discussion only. While both treatments effectively reduced levels of smoking among inchoate smokers, few changes were noted for youngsters manifesting more long-term, entrenched habits. Levels of smoking for children monitored in a control school remained about the same. These data suggest that early preventive programs might be most efficacious in curtailing smoking among school-age children. (Author)

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Comparative Effectiveness of Smoking Prevention Programs

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Comparative Effectiveness of Smoking Prevention Programs

Over the past 30 years, evidence has accumulated documenting debilitating health hazards associated with smoking. For example, smoking accounts for 25% of all cancers (Reif, 1976) and 80% of lung cancer, and is an important cause of chronic bronchitis and emphysema (Diehl, 1969). Given these patent health hazards, it is particularly disturbing that over 3,000 school-age children start smoking each day (Garell, 1976). Mausner and Platt (1971) suggest that youngsters begin to smoke for its symbolic significance (i.e., smoking is associated with adult status, freedom, and daring) and to gain support and approval from peers. Smoking prevention interventions might emphasize the negative aspects of smoking, establish assertive responses to resist pressure to smoke, and build peer support for either quitting or not beginning to smoke.

The majority of smoking intervention projects have been directed at adults. Unfortunately, a recent review by Thompson (1978) indicated that significant behavioral changes were not produced by anti-smoking campaigns which employed either advertising, pamphlets, exhibits, films, group discussions, or public lectures. In contrast, salutary short-term gains have been reported with diverse behavior modification techniques, including rapid smoking (Glasgow, 1978), systematic desensitization (Levenberg & Wagner, 1976), alternative response (Sutherland, Amit, Golden, & Roseberger, 1975), electric shock (Conway, 1977), covert modelling (Neese & Nelson, 1977), and contractual management (Elliot & Tighe, 1968). Although there are several exceptions (Dericco, Brigham, & Garlington, 1977 ; Greenberg & Altman, 1976; Lando, 1977), the vast majority of behavioral anti-smoking interventions have manifested serious erosion effects during follow-up evaluations (McFall,

1978). Switching the intervention targets from those with well-crystallized habits to those with incipient smoking patterns might result in more favorable outcomes. This is supported by Perri, Richards, and Schultheis' (in press) study which found unsuccessful smoking reducers, in contrast to those who were successful, had more long-standing, entrenched smoking habits.

A variety of anti-smoking campaigns have been directed toward school-age children. For example, Merki, Creswell, Stone, Huffman, and Newman (1968) employed student presentations and discussion groups whereas Watson (1966) had teachers use psychological persuasion to bring about significant attitude changes toward an anti-smoking position. Regrettably, reductions in actual smoking behaviors have been infrequently achieved in school anti-smoking campaigns (Thompson, 1978). Where reductions in levels of smoking have been reported (Estrin & Querry, 1965), methodological problems make it difficult to determine whether significant changes occurred. There is a need to identify and evaluate effective intervention strategies which might be applicable to school age populations.

Role-playing might represent an effective behavioral strategy for reducing or preventing the onset of smoking in school children. Role-playing has been successfully used with disparate clinical issues, including increasing assertion in college students (Friedman, 1971) and training alcoholics to abstain from drinking (Foy, Miller, Eisler, & O'Toole, 1977). Horn (1960) was the first investigator to use role-playing in an attempt to modify smoking habits. The intervention, which had target youngsters taking the role of providing information to their parents on the dangers of smoking, led to a small decrease in the number of students who would have otherwise begun smoking. A series of investigators (Janis & Mann, 1965; Mann, 1967; Strelzer & Koch, 1968) had smokers role play scenes revolving around being told by a physician

that they had lung cancer due to cigaret smoking. Significant short and long-term reductions (Mann & Janis, 1968) in cigaret consumption were noted. Evans (1976) has described a program which identified the dangers of smoking, enumerated ubiquitous pressures to begin smoking, reviewed responses to resist these pressures, and presented videotapes of children role playing various anti-smoking scenes. Using this program as a model, McAlister, Perry, and Maccoby (in press) had peer leaders implement an intervention which included discussion and role playing. At the end of the school year, only 5.6% of fifth and sixth graders in the experimental school were smokers, whereas 9.9% smoked in the control school. This investigation suggests that role-playing in combination with discussion might be an effective deterrent against smoking.

The present study continues a series of investigations at DePaul University conducted over the past two years. During the first year, a group of ninth graders (three were smokers and wanted to stop this habit, two were nonsmokers and were experiencing peer pressure to begin smoking) were brought together for seven hourly group sessions, which focused on discussing problems centering on resisting smoking, role playing difficult situations, and cognitive modelling. Rates of smoking were reduced among smokers, and none of the nonsmokers began to smoke (Jason, Note 1). The next year, two entire health classes served as the treatment group and a third class served as controls (Spitzzeri & Jason, 1979). The treatment group engaged in seven weekly role playing sketches, depicting everyday encounters with smoking. A fifteen minute discussion followed each role play. At program end, rates of smoking decreased for E children and increased for Cs. Gains in the E group were maintained at a three month follow-up.

The present study differs from the two previous investigations in the following ways; a) sample size was increased, b) children within classes were assigned to treatment conditions, and c) smoking status of children in a control school was monitored. The study's major goal was to reduce rates of smoking among school children. It was hypothesized that children offered role-playing and discussion as compared to those receiving only the discussion would evidence significantly more anti-smoking attitudes and positive behavioral change by treatment end and at follow-up. In addition, it was predicted that those offered either intervention would evidence more salutary change than nonprogram youngsters.

Method

Site and Participants

The intervention (E) occurred in a parochial high school and involved an entire class of ninth graders (149 youngsters). The 66 control ninth graders (C) were enrolled in a different parochial high school. In the E school, there were 4 classes of students. Within each class, current smokers were identified, placed in pairs, then randomly assigned to an E_1 (role-playing plus discussion intervention) or E_2 condition (discussion intervention).[1] The nonsmokers in each class were also randomly assigned to the E_1 and E_2 groups. While there were no sex differences between the E_1, E2, and C groups ($x^2(2) = 5.60$)[2], there were significant racial differences ($x^2(6) = 96.06$, $p < .01$)[3]. In the treatment school, there were more Blacks and Latinos, whereas there were more Caucasians in the control school.

Program

Each of the classes in the E school was divided into groups of about 9-10 students. Two of these groups were designated role-play plus discussion

(E_1) and two were designated discussion only (E_2). Four advanced psychology students (2 males, 2 females) led the groups. Each graduate student led 2 E_1 and 2 E_2 groups. Each of the 6 weekly E_1 and E_2 sessions lasted about 30 minutes.

The E_1 groups were exposed to three different role plays, each scene emphasizing a different negative aspect of smoking (immediate negative consequences perceived by oneself, perceived by others, and long-term health hazards). Each scene (or slight variation) was role played for two sessions and all students in the E_1 group participated in at least one role play. Following the role-play, the students discussed the role-play or other topic related to smoking. The first role play involved a dialogue between a girl and a male smoker. The girl pointed out that the smoker had a smell of stale smoke on his clothing, bad breath, and stains on his fingers and teeth. This scene emphasized negative components of smoking as perceived by individuals in proximity to the smoker. The second scene involved two students talking; one was a smoker who didn't make the basketball team and the other was a nonsmoker who was on the team. The dialogue highlighted the fact that the smoker didn't make the team because smoking caused shortness of breath. In addition smoking impaired the player's sense of taste and smell. This scene accentuated immediate aversive correlates of smoking as perceived by the smoker. The last scene involved a patient and a doctor. During the scene, the doctor indicated that the patient had lung cancer and had to undergo surgery. This scene highlighted pernicious long-term consequences of smoking.

The discussion group (E_2) was student centered, and provided the youngsters an opportunity to talk about any aspect of smoking (e.g., reasons people begin to smoke, health hazards associated with smoking, ways of reducing smoking, etc.). During the discussions, the youngsters debated

among themselves different issues related to smoking.

Criterion measures

All measures were filled out by students in the experimental and control schools (with the exception of the consumer satisfaction scale).[4]

After permission forms were filled out by both the students and their parents, the youngsters completed a Smoking Survey. This instrument requested information on demographic characteristics, current smoking status, past history of smoking, estimated probability for ceasing to smoke, smoking status of parents and friends, and drinking status. Nonsmokers were also asked whether they were exposed to peer pressure to begin smoking. Smokers were asked to write down a parent's or a friend's name and phone number, who could confirm whether they quit smoking at the end of the program.

During the subsequent week, the youngsters who smoked filled out a card which estimated their daily smoking patterns for one week. They also filled out a Motivation Questionnaire. The four, 5-point items from this scale were adopted from a study by Lichtenstein, Keutzer, and Himes (1969). Lower scores on each item indicate more positive anti-smoking attitudes. The motivation index used in data analysis was the sum of the 4 items. During the testing session, all students were also tested on an ecolyzer, which assesses the amount of carbon monoxide in a person's exhaled breath. This measure is a reliable method of assessing children's smoking status (Hughes, Frederiksen, & Frazier, 1978). Data was also gathered on the estimation of daily smoking patterns, Motivation Questionnaire, and Ecolyzer at a postpoint and follow-up period.

Prior to the start of the intervention, two weeks elapsed to collect data from children who had been previously absent. During each of these weeks, all children filled out a form indicating whether they smoked, and and how many cigarets per day (The C youngsters also filled out the form).

The average of these scores was used in later data analyses as the index of smoking consumption at prepoint. During the 6 week program, children in the treatment conditions as well as those in the C school, filled out a similar form, indicating their smoking status.

All E_1 and E_2 children filled out a consumer satisfaction questionnaire at program end. There were 8 five-point items on this scale, with higher numbers indicating more satisfaction or favorable results. The youngsters rated how well the goals of the program were met (i.e., reduce rates of cigaret smoking, improve knowledge of the effects of smoking, and increase motivation not to smoke), how useful the procedures were, whether the group leaders were knowledgeable and likeable, and whether they would recommend this program to other students.

Results

Criterion Measures

Changes among the 3 conditions (E_1, E_2, C) at postpoint and follow-up for the motivation, ecolyzer, and cigaret consumption indices were analyzed using an analysis of covariance (with pre-test scores as covariates) (Winer, 1971). For nonsmokers, there were no significant postpoint or follow-up point differences among conditions (E_1, E_2, C) for the motivation scores. For smokers, at postpoint there were significant differences in motivation scores ($F(2, 28) = 3.77$, $p < .05$). The adjusted postpoint scores for the E_1, E_2 and C groups were 9.77, 9.35, and 11.16, respectively (lower scores being more positive). Employing planned comparisons, there were no significant E_1 versus E_2 differences ($F(1, 31) = .36$), E_1 versus C differences approached significance ($F(1, 31) = 3.64$, $p < .10$), and there were significant E_2 versus C differences ($F(1, 31) = 6.98$, $p < .05$). At the follow-up point, there were no significant differences among conditions for the motivation

indices.

For both the ecolyzer scores as well as the number of cigarets smoked, there were no significant differences between conditions at postpoint or follow-up for smokers. Meaningful changes, however, did occur for the number of smokers who quit and reduced rates of smoking. Figure 1 presents the number of smokers for the three groups across time. While 59% (13/22)

Insert Figures 1 and 2 about here

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of E_1 and E_2 smokers had quit by follow-up, only 10% (1/10) of C smokers were abstinent at this time ($x^2(1) = 4.89$, $p < .05$). In addition, when smokers were classified as experimenting (those 18 treatment and 8 control smokers who consumed <10 cigarets daily) or regular (those 4 treatment and 2 control children who smoked ≥10 cigarets each day), Figure 2 indicates that experimenting E smokers decreased consumption over time (from 2 to .6), whereas increases were noted for the regular E youngsters (19.7 to 21.8). In contrast, for C children, increases were noted for experimenting smokers (2.3 to 6.2), and decreases for regular smokers (16.3 to 8.7)

In regard to nonsmoking children starting to smoke, at follow-up, 5% of the E youngsters smoked an average of 3.2 cigarets and 4% of the C's smoked an average of 7.5 cigarets daily. Had follow-up periods for the C group been equivalent to the E group, there might have been more C smokers.

Ancillary measures

While 4 treatment smokers indicated neither of their parents smoked at prepoint, by follow-up 9 indicated their parents didn't smoke. In the control school, 4 smokers indicated their parents didn't smoke at either the pre or follow-up periods. Another interesting finding concerned whether the youngsters drank alcoholic beverages. While 43 of the treatment youngsters drank at prepoint,

only 32 indicated they drank at follow-up. In contrast, among control children, 27 indicated they drank at prepoint, and 32 at follow-up.

Intercorrelations

Separate pre-point correlational matrices were generated for the treatment children and the control youngsters. The more cigarets the youngsters smoked, the higher their ecolyzer scores ($r = .68$, $p < .01$; $r = .58$, $p < .01$), (in this analysis and the ones to follow, the treatment group is presented first, the control group second) and the lower their estimated probability for stopping the smoking habit ($r = -.63$, $p < .01$; $r = -.53$, $p < .05$). In addition, the longer the children had smoked, the lower their estimated probability for quitting ($r = -.52$, $p < .05$; $r = -.55$, $p < .05$). Finally, if youngsters had experimented with smoking, they had a greater chance of drinking ($r = .35$, $p < .01$; $r = .35$, $p < .01$) and having friends who smoked ($r = .35$, $p < .01$; $r = .45$, $p < .01$).

Consumer Satisfaction

On the 8-item Consumer Satisfaction Questionnaire, there were no significant E_1 versus E_2 differences among the smokers. For nonsmokers, the E_2 children rated the discussion procedures as significantly more useful ($t(119) = -3.48$, $p < .01$). The E_2 nonsmokers also indicated they received significantly more knowledge of the effects of smoking ($t(119) = -2.19$, $p < .05$). Ratings for all items tended to be positive, and youngsters in both groups indicated they would recommend the program for use with other students.

Discussion

Although a central hypothesis was that the two treatments would be differentially effective, the results indicate few differences between the E_1 and E_2 conditions. Both treatments, however, produced more short and

long-term abstinence among smokers than the control condition. In addition, the treatments had their most profound effects on the experimenting smokers. The interventions appear to be particularly potent in dissuading youngsters from continuing to experiment with smoking. Rates of smoking among those classified as regular smokers actually increased. In terms of preventing the onset of smoking, neither intervention appeared to be effective in attaining this goal.

While the discussion group was initially conceptualized as a student-centered intervention, the actual implemented program was not that distinct from the E_2 intervention. The group leaders, who had been presenting an active, directive program for the E_2 youngsters, slowly spontaneously introduced more dynamic, involvement engendering activities into their discussion groups. For example, they divided their groups into two teams, and ascertained which team was able to answer more questions pertaining to issues involving smoking. In addition, they chose two members of a group to engage each other in debating issues pertaining to smoking. The group leaders actively experimented with different techniques to elicit more interest, enthusiasm,and commitment among the youngsters. When an innovation was successful, the group leader immediately shared the information with the other leaders. Unfortunately, components of these innovations had role-playing features within them.

In the control condition, over time rates of smoking decreased for regular smokers and increased for experimenting smokers. Within the treatment conditions, the exact opposite findings emerged. Conceivably, the experimenting control smokers were more influenced by smoking peers to continue or to increase their smoking habits. In contrast, the treatment experimenting smokers were apprised of the fact that few of the members of their group smoked, were confronted with situations denigrating the act of smoking, and

had the opportunity to practice assertive responses to resist peer or other pressures instigating the youngsters to maintain their habits. Completing questionnaires assessing motivation and smoking habits, as well as being tested on a ecolyzer, had a positive reactive effect with the regular smokers in the control condition. On the other hand, the intrusive, confrontative approach utilized in the treatment conditions with regular smokers precipitated negative second order effects. Regular smokers might have had more negative expectations about the efficacy of the interventions. In addition, they might have felt stigmatized as a "deviant" minority in their respective groups. Reacting defensively, the youngsters marginally participated in the program and became more entrenched in their addictions. Perhaps future behavioral projects might involve entire groups of regular smokers in anti-smoking interventions. In addition, since children with longer habits have lower expectations for quitting, preventive projects are needed to catch incipient smokers before their habits have become well-crystallized.

Several methodological problems were encountered in implementing the study. These include a) differences in racial characteristics between children in the treatment and control conditions, b) a discussion intervention which deviated markedly from the original version, c) follow-up periods which differed in length of time, and d) inadequate sample sizes to statistically evaluate changes over time for the experimenting and regular smokers. Although research conducted in the real world often lacks pristine experimental controls present in laboratory investigations, it is incumbent upon investigators to recognize the internal and external confounding influences as well as to attempt to reduce these biases in future investigations.

Given the clear-cut health hazards associated with long-term smoking

patterns, there is a need to validate preventive interventions with school-age children. A primary finding was that the interventions were differentially effective with different target groups of youngsters. The present study indicates that anti-smoking interventions directed towards experimenting smokers can produce favorable results. The present study needs to be replicated to determine whether experimenting smokers are again found to be the primary beneficiaries of anti-smoking programs. There is also a need to investigate approaches which produce similar salutary results with the regular smokers as well as to prevent smokers from beginning this maladaptive habit.

Reference Notes

1. Jason, L. A. Research collaboration between academia and the real world. Paper presented at the American Psychological Association. San Francisco, August, 1979.

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Footnotes

[1]One tenth grader who smoked was in the class. This child was assigned to the E_1 group. Several smokers ($2E_1$s, $1E_2$, 1C) transferred or left school prior to collection of all data. These children were eliminated from data analyses.

[2]In the E_1 group, there were 28 males and 47 females. There were 30 males and 44 females in the E_2 group and 37 males and 29 females in the C group.

[3]There were 12 Caucasians, 29 Blacks, 28 Latinos, and 6 Orientals in the E_1 group; 9 Caucasians, 30 Blacks, 27 Latinos, and 8 Orientals in the E_2 group; and 54 Caucasians, 1 Black, 7 Latinos, and 4 Orientals in the C group.

[4]The control school was administered the battery of pre-tests six weeks after the pre-tests were administered to the E class. Unfortunately, this necessitated a shorter follow-up period. Whereas there was a 5 months period between the E post testing and the follow-up, there was only a 2½ month period between these two testing periods for the control youngsters.

Figure Captions

Figure 1. Number of smokers at pre, post, and follow-up periods.

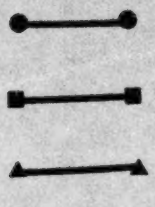
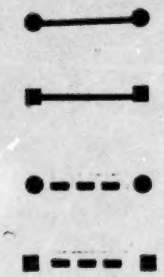
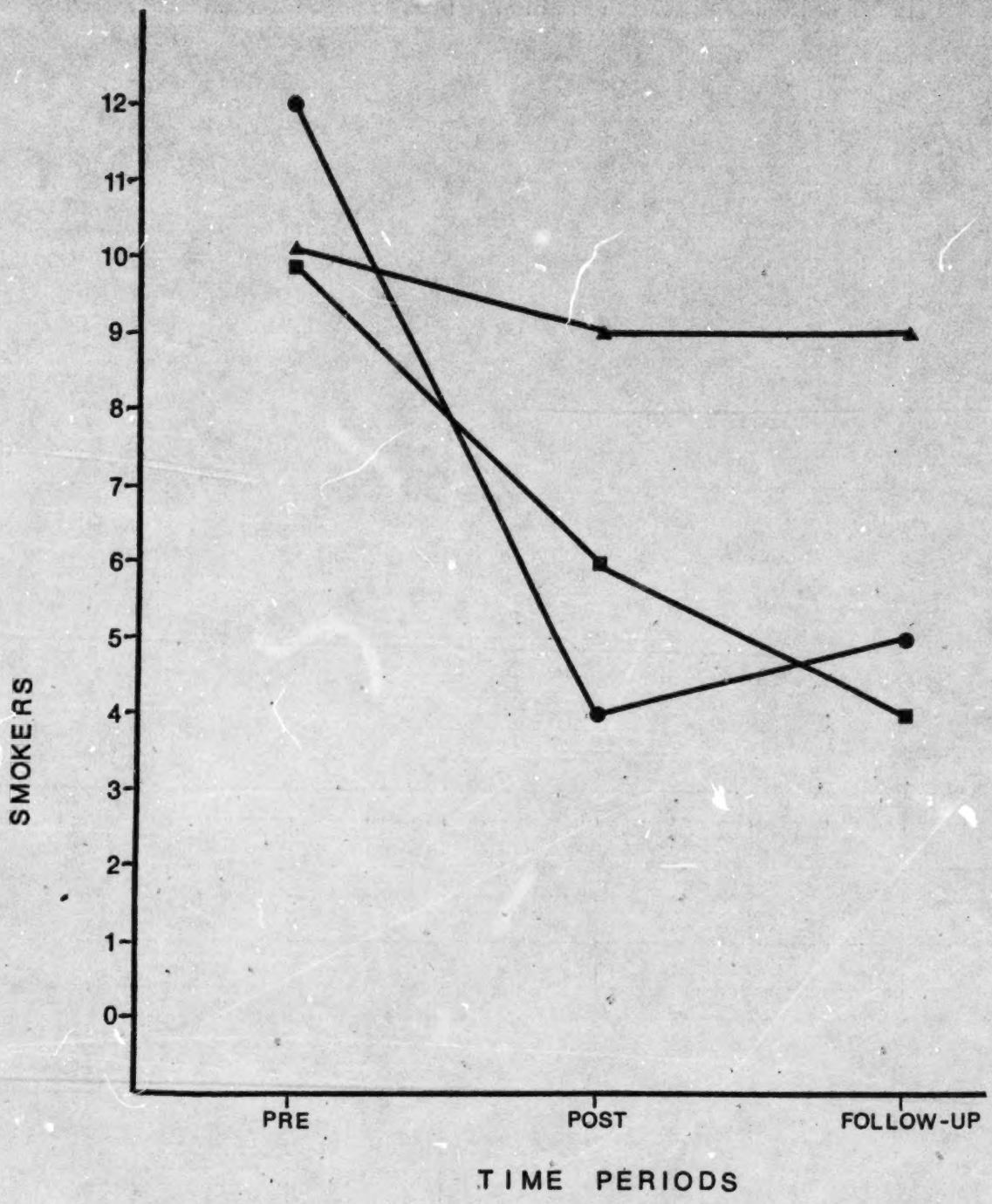


Figure 2. Number of cigarets smoked for Experimenting (smoking <10 cigarets per day) and Regular ($\geq$ 10 cigarets) smokers across pre, post, and follow-up periods.

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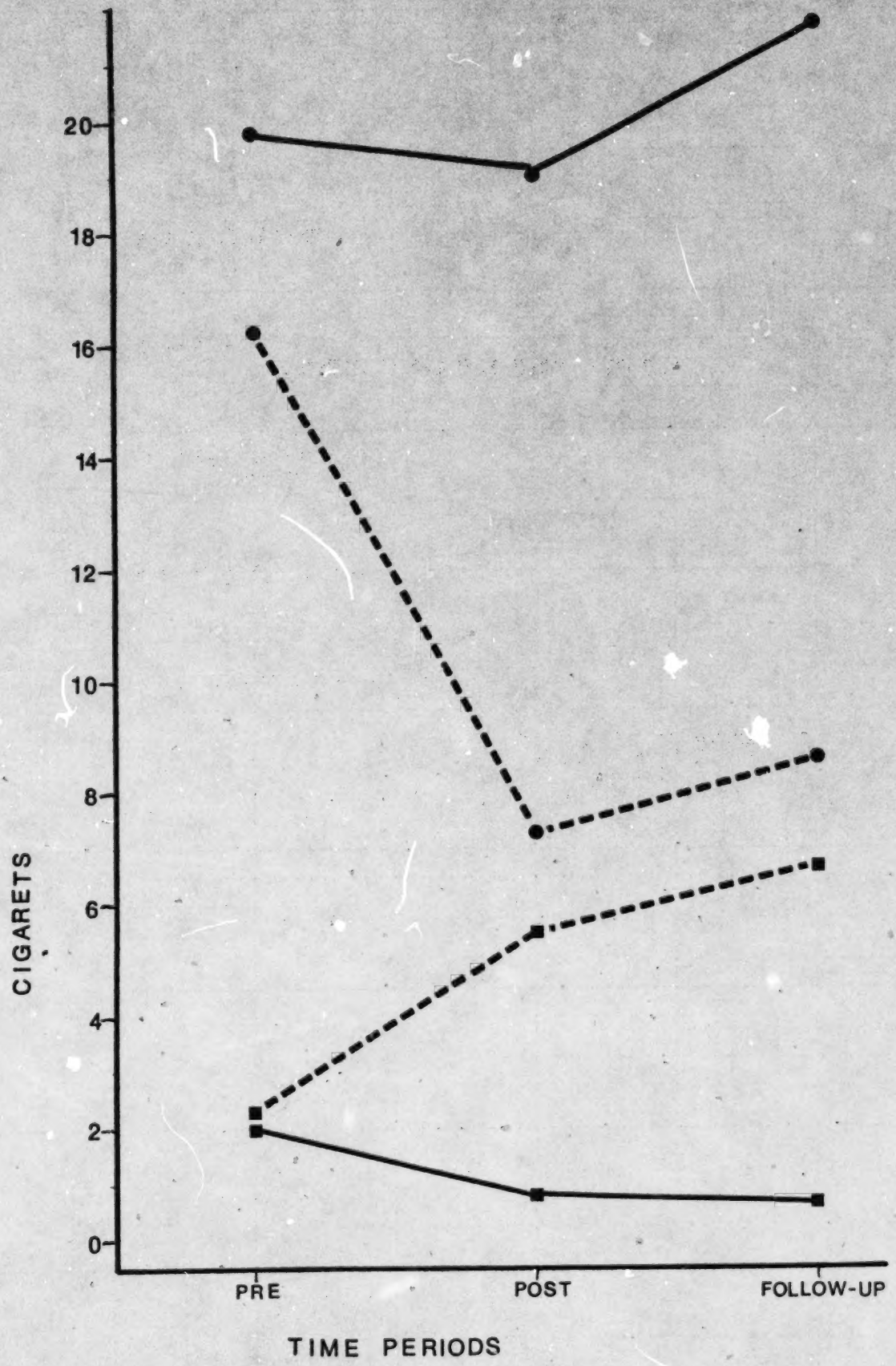
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